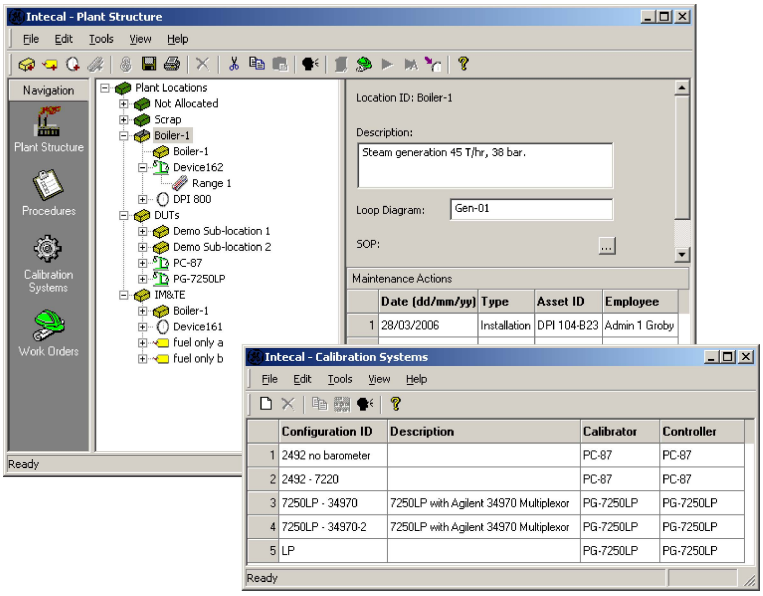
GE
Sensing

Intecal

calibration software

User manual - K0420



Safety

Before you use the Intecal software program, make sure that you read and understand all the related data. This includes: the applicable local safety procedures, the instructions for the equipment you are using with the software, and this publication.

When you use equipment with this software, make sure that it is serviceable and that it is in its normal condition for safe operation.

Before you start an operation or procedure in this publication, make sure that you have the necessary skills (if necessary, with qualifications from an approved training establishment). Follow good engineering practice at all times.

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Trademarks

All product names are trademarks of their respective companies.

Microsoft, Excel, and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

InstallShield is a registered trademark and service mark of InstallShield Software Corporation in the United States and/or other countries.

Software purpose

The Intecal calibration software is a Windows-based calibration management tool that helps you maintain and control your calibration environment to the highest standards of metrology. Available in different languages, you can use the software for these tasks:

- Manage the maintenance and calibration of all the measurement devices for a specified business location.
- Set up a schedule of calibration work for different employees.
- Upload and download data to and from portable calibrators that have a serial communications function or an IEEE 488 interface (Druck, Ruska, or devices with a Field Calibrator Interface - FCINTF).
- Manage the calibration records for devices that do not have a serial communications function or an IEEE 488 interface (*Manual Data Entry*).

- Inspect your calibration history records. You can also make a permanent record of each calibration report. For example: For ISO 9000 quality control procedures.
- (Intecal-Advanced only) Set up automatic calibration systems to make full use of your GE calibrators and controllers (Ruska and Druck) or alternative systems with an FCINTF facility.
- (Intecal-Advanced only) Calibrate a *Device* that has a serial communications function or an IEEE 488 interface (Druck, Ruska, or FCINTF).

Registration

The Intecal calibration software (from a CD or downloaded from the Web) is available for you to try as a fully functional product, with no obligation, for a period of 30 days. The trial period starts on the day it is first used - not on the day it is installed.

To change the 30 day license to a full license, please purchase the applicable software license (Intecal-Advanced or Intecal Basic) from the GE Sensing sales team at: www.gesensing.com.

Please read the *Registration Help* available in the *Registration Tool:* Use the Intecal program group (Figure 2-1) or use the Intecal menu: *Help > Registration ...* .

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Chapter 1: Installation

System specification

To use the Intecal software, this is the minimum specification for your computer:

- Operating system: Windows 2000, Windows NT 4.0 or Windows XP
- 66 MHz processor (Pentium® recommended)
- 128 MB of RAM (256 MB recommended)
- Hard disk space: 40 MB for the installation, then 10 MB to permit expansion of the database
- CD-ROM drive or DVD-ROM drive

Install Intecal software

You can install the software from a CD or from the Internet.

Before you install the software, close all other Windows applications.

Install Intecal from a CD:

1. Insert the CD into the CD-ROM drive

*Note: If your computer is not set up to open a CD automatically, you must open the file from the CD yourself. Double-click the file Intecal***.exe*

*(*** represents the applicable software version)*

2. When the InstallShield® Wizard opens on your computer, follow the on-screen instructions.

Install Intecal from the Web:

1. Follow the instructions on the Web page to save the specified *File name* (Example: Intecal***.exe) to your computer.
2. When the *File Download* is complete, open the file from the specified *Save in* location.
3. When the InstallShield Wizard opens on your computer, follow the on-screen instructions.

Software updates

If a new version of the software becomes available, you can download it from the Internet (www.gesensing.com).

After installation

When the installation is complete, you can start using the software (Refer to Chapter 2).

Remove the Intecal software

If it is necessary to remove the software from a computer, use these steps:

1. On the Windows taskbar, click on the *Start* button and select *Settings* > *Control Panel* > *Add/Remove Programs*.
2. Select the software program (Intecal*)* and select the “Remove” option.
3. Follow the on-screen instructions.

Chapter 2: Getting started

Introduction

This chapter gives a description of these items:

- the procedure the first time you use the Intecal software
- the general structure of the screens you will see.
- the general structure of the Intecal program.
- how to set up your *Employee* data and control the software tasks they can do.
- the procedure to set a different language for the software.

Start the software

The first time you use the Intecal software, use this log-in procedure:

1. Double-click on the Desktop icon.

2. If you are in the 30 day trial period (before you purchase the software), you can choose the version you want to use: Intecal Basic or Intecal-Advanced.
3. When the log-in window opens, enter **1** in the *User Name* box. Leave the *Password* box empty.

4. Click on OK.

Note: You can also start intecal from the Intecal program group (Figure 2-1).

After you log in, you can use the *Employee Manager* to set up a database of *Employees* (with applicable *User Name* data) and/or change your own password. Refer to “Employee Manager”.

All other users must enter their specified *User Name.* This is also the default password the first time they log in. All passwords are case sensitive.

Start up - Program group

Figure 2-1 shows the program group when you click on: *Start* > *Programs* > *GE* Intecal:

Intecal: This starts the Intecal software.

ReadMeFirst: This text file contains important notes and software release information.

Registration Tool: To purchase the software, you can use this option to read the *Registration Help* file and then set up the registration data.

Intecal User Manual: This opens a PDF file for the user manual. You must have a copy of the Adobe® Reader® software (Visit www.adobe.com).

Intecal help: This opens the online help system.

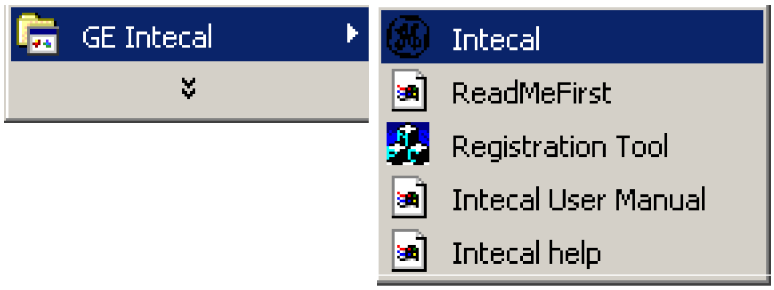


Figure 2-1: *Intecal program group*

Screen structure

When you start the software, Figure 2-2 gives an example of the window that opens. These items are common to all the main program functions:

1 - Navigation bar: Use this to move between the different program functions (Plant structure, Procedures ...)

2 - Menu bar: Use this to select a task from a menu list.

3 - Tool bar: Use this to select a task with an icon.

The Menu bar and Tool bar include common items and special items for the program function you are using.

The common items include: *Save*, *Exit*, *Employee Manager*, *Language Selection*, *Backup Database*, *Customer Report Details*, *Find*, *Intecal Help*, and *Registration.*

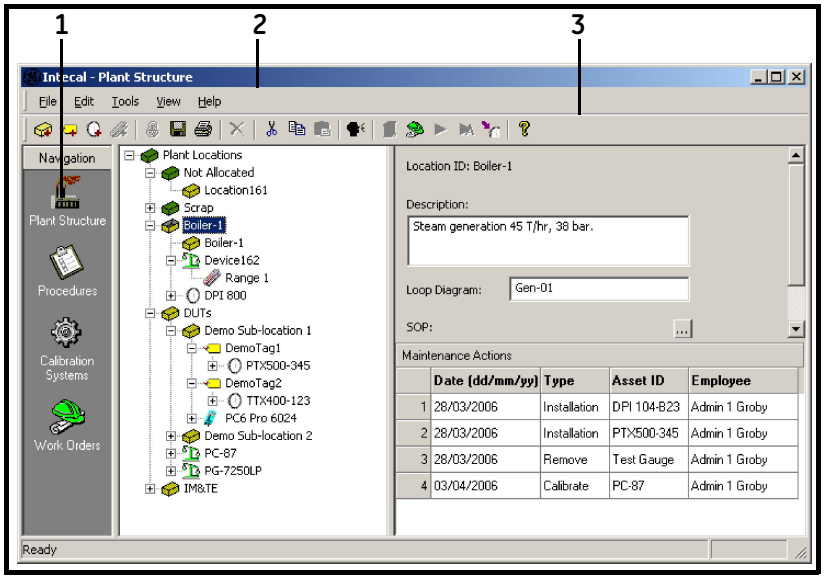


Figure 2-2: *Screen structure - Common items*

Program structure

The software has four main program functions:

Plant Structure: To manage and organize your database of devices.

Procedures: To manage the calibration procedures in your database. A calibration procedure contains the values a calibration uses (test points, ramp time).

Calibration Systems (Intecal-Advanced only): To manage the hardware configurations you use to do your calibrations.

Work Orders: To manage your calibration work.

Use the Navigation Bar to move between the different program functions.

Employee Manager

Use the *Employee Manager* (Figure 2-3) to set up and maintain a list of your *Employees*. You can then use the software to see the *Employees* related to each task and calibration.

You can use the *Employee Manager* to do these tasks:

- Create a new *Employee*. To use the software, you must include a *User Name* and one of four permission levels.
- Delete an *Employee*, change the status (Active/Not active) or change the *Employee* data.
- Change your own password.

Permission levels

The *Permission Level* that you set up for an *Employee* (Refer to "Set up Employee data") controls the software tasks they can do:

Administrator: You can do all the program tasks.

Supervisor: You can do all the program tasks but you cannot change the user *Permission Level*.

Technician: You can do all the daily operations but you cannot set up or change *Procedures* or *Calibration Systems*.

Auditor: You can read the Intecal data and change your own *Employee* data.

Set up Employee data

You must have the necessary *Permission Level* for this task.

To set up a new *Employee*:

1. Select *Tools* > *Employee Manager* from the menu bar.
2. When the *Employee Manager* window opens (Figure 2-3), click on the *New* button

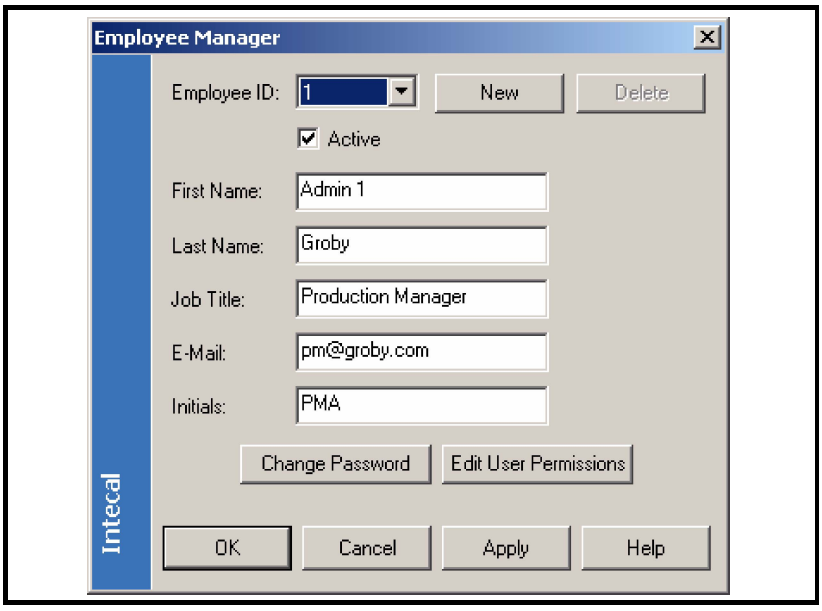


Figure 2-3: *Employee Manager window*

3. When the new *Employee ID* window opens (Figure 2-4), enter a unique number and click on OK.

Figure 2-4: *New Employee ID window*

4. In the *Employee Manager* window (Figure 2-3), click on the *Active* check-box. This sets the status (active or not active).
5. Enter the applicable values in these boxes: *First Name*, *Last Name* (Mandatory), *Job Title*, *Email*, *Initials*.
6. (*Administrator* only) Click on the *Edit User Permissions* button.

7. When the *Edit User Permissions* window opens (Figure 2-5), enter applicable values for these items:

User Name: An *Employee* can only use the software if they have a *User Name*. This is also the default password the first time they log in.

Permission Level: Select the applicable *Permission Level* from the drop-down list. Refer to “Permission levels”.

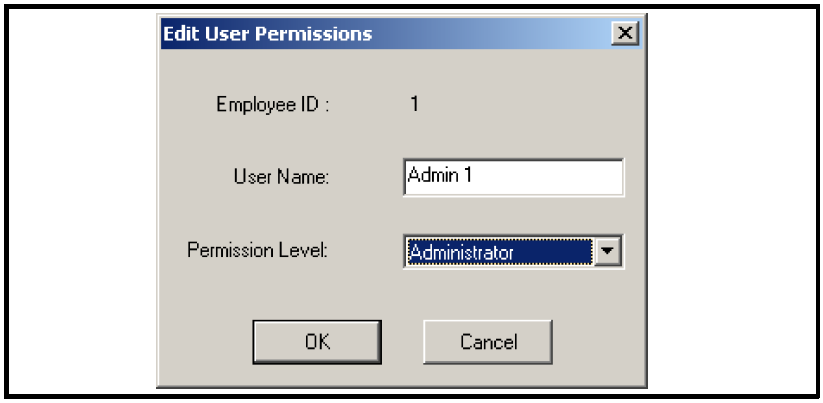


Figure 2-5: *Edit User Permissions window*

8. When the *User Permissions* data is set up, click on OK. Then click on the applicable button in the *Employee Manager* window:

OK: To confirm the data and leave the *Employee Manager* window.

Cancel: To cancel the data and leave the *Employee Manager* window.

Apply: To apply the data and continue to use the *Employee Manager* window.

Change Employee data

You must have the necessary *Permission Level* for this task. Refer to “Permission levels”.

To change the *Employee* data:

1. Select *Tools* > *Employee Manager* from the menu bar.
2. When the *Employee Manager* window opens (Figure 2-3), select the applicable *Employee ID* from the drop-down list.
3. Change the applicable data. Refer to “Set up Employee data”, steps 4 to 8.

Set up your password

You can only set up or change your own password. To set a password:

1. Select *Tools* > *Employee Manager* from the menu bar.
2. When the *Employee Manager* window opens (Figure 2-3), select the applicable *Employee ID* from the drop-down list.
3. Click on the *Change Password* button.
4. When the *Change Password* window opens (Figure 2-6), enter the applicable password.

Note: All passwords are case sensitive.

Figure 2-6: *Change Password window*

5. When you confirm the password in the second box, click on OK.

Delete an Employee

You must have the necessary *Permission Level* for this task. Refer to "Permission levels".

Note: If you cannot delete an Employee ID because it is used in a calibration, you can set it to not active.

To delete an *Employee*:

1. Select *Tools* > *Employee Manager* from the menu bar.
2. When the *Employee Manager* window opens (Figure 2-3), select the applicable *Employee ID* from the drop-down list.
3. Click on the *Delete* button.

You must confirm that you want to delete the *Employee ID*.

Select a language

The software can operate in a number of different languages.

To change to a different language, use one of these methods:

- Click on the *Language Selection* button in the tool bar.
- Select *Tools* > *Language Selection* from the menu bar.

When the *Language Selection* window opens (Figure 2-7), select the applicable language and click on OK.

Note: When you click on OK, the software immediately closes and restarts.

Figure 2-7: *Language Selection window*

Backup Database

Use this option to make a backup copy of your Intecal database.

1. Select *Tools* > *Backup Database* ... from the menu bar.
2. In the window that opens, set a file name and file location for the *.mdb file and click on *OK*.

Set Customer Report Details

Use this option to set up your calibration reports (Chapter 7) with a company logo (**1**), a company address (**2**) and standard footer text (**3**). See Figure 2-8.

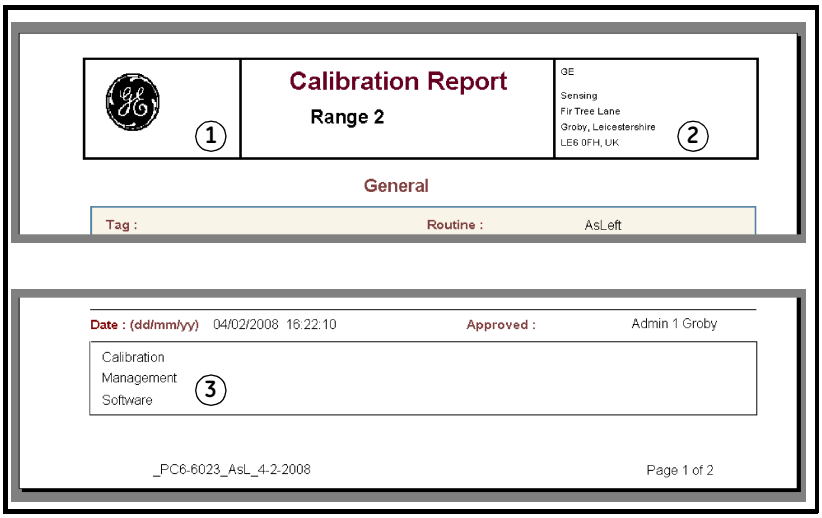


Figure 2-8: *Calibration Report Details (Header/Footer)*

Setup procedure (Report details)

1. Select *Tools* > *Customer Report Details* from the menu bar. See Figure 2-9.

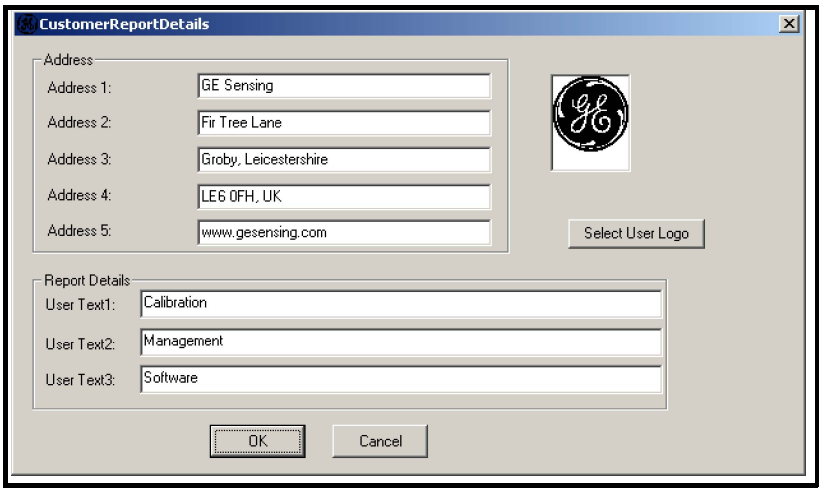


Figure 2-9: *Calibration Report Details*

2. Set the necessary data (*Address*; *Report Details*):

Address (1 to 5): Enter up to 15 characters on each line.

User Text (1 to 3): Enter up to 67 characters on each line.

3. To change the company logo, click on *Select User Logo*. A file selection window opens.

4. If necessary, select a different Directory. Then select the *.bmp file for the applicable company logo and click on OK.

   The software uses the specified *.bmp file to replace the file "logo.bmp" in the Intecal folder on your computer. For example: In folder C:\Program Files\ ... \Intecal. It also makes a backup of the old logo file.

Note: The logo you use must have width ≤ 80 pixels; length ≤ 170 pixels.

5. To accept the settings, click on *OK*. The software applies the new *Address* and *Report Details* to all new calibration reports. The new logo goes on all your calibration reports.

Use the Find facility

When you have different *Devices* in different *Locations* in your *Plant Structure*, you can find them quickly with *Find*. This includes all or part of these items:

- Location ID
- Asset ID
- Tag ID
- Device Description

Setup procedure (Find)

1. Select *Tools* > *Find* from the menu bar. See Figure 2-10.

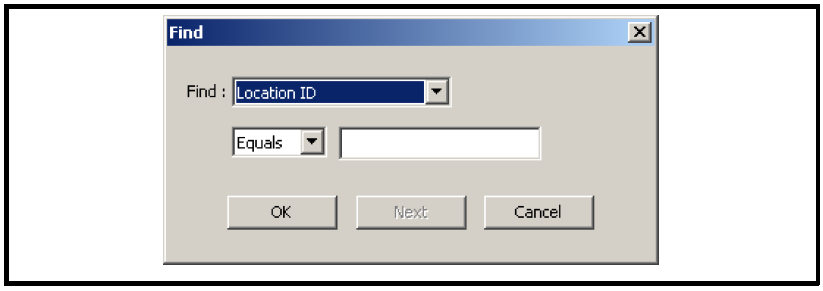


Figure 2-10: *Calibration Report Details (Header/Footer)*

2. Click on the *Find* drop-down menu ▼ and select one of the options: *Location ID*; *Tag ID*; *Asset ID*; *Device Description*
3. Enter the applicable characters you want to find.
4. Click on the drop-down menu ▼ and set how the *Find* operation is done:

Equal: The specified characters give the complete *ID* or *Description.*

Begin: The specified characters give the initial characters of the *ID* or *Description.*

Contain: The specified characters give part of the *ID* or *Description.*

5. Click on *OK*. If the software finds the characters, it shows the *Plant Structure* window and the first item.
6. To find the next item with the specified characters, click on *Next*.
7. To close the *Find* window, click on *Cancel*.

Chapter 3: Plant Structure

Introduction

Use Intecal *Plant Structure* to manage and organize your database of devices in the same way as you use Windows® Explorer to organize files and folders. Figure 3-1 shows the *Plant Structure* window.

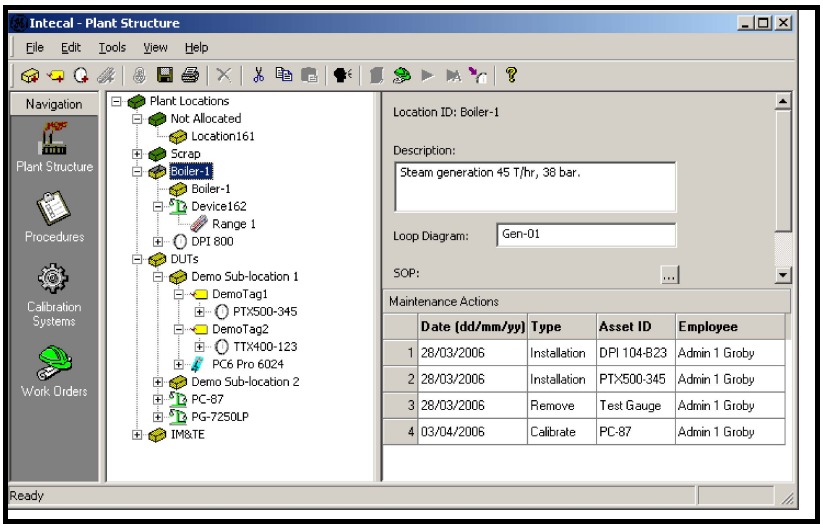


Figure 3-1: *Plant Structure window*

The tree structure lets you represent all the physical locations and devices for your site in a single view. You can set up: sub-locations, tags, devices and device ranges.

When you click on an item in the tree structure, the screen shows the related data. For example:

- the data set up for the *Location*, *Tag* or *Device* and the related *Maintenance Actions*
- the range calibration data and the related *Calibration History*

You can use the *Plant Structure* function to do these tasks:

- To set up or change the sub-locations, tags, devices and device ranges.
- To set up or change the related *Maintenance Actions*.
- Chapter 6: To add items to a *Work Order.*
- Chapter 7: To see the calibration history for a *Device* or *Range*.
- Chapter 7: (Intecal-Advanced only) To calibrate a *Device* or to make calibration adjustments.

Locations

A location or sub location usually represents a physical location on your site (Example: a building or room) but you can set up any alternative group structure (Example: Druck, Ruska). You can put more than one device in a location

Create a Sub-location

To create a *Sub-location*, click on an applicable location or sub-location and use one of these methods:

- Click on the new *Sub-Location* button in the tool bar
- Select *File* > *New* > *Sub-Location* from the menu bar.
- Right-click and select *New* > *Sub-Location*.

Edit a Sub-location

When you create a *Sub location*, the Intecal software gives it the next *Location ID* in the sequence (Figure 3-2).

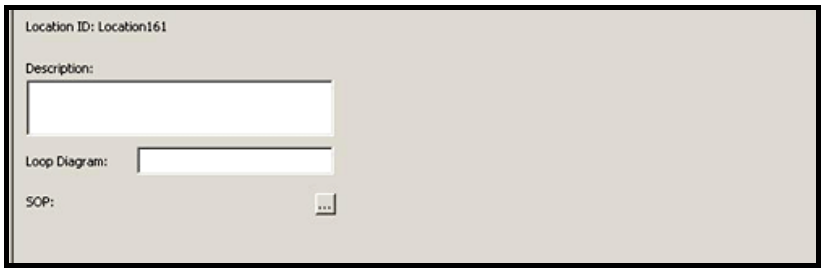


Figure 3-2: *Location Detail View*

Description: Up to 123 characters.

Loop Diagram: Up to 255 characters.

SOP (Standard Operating Procedure): Use this to set up a link to a file on your computer system (Example: PDF, TIFF, TXT, DOC).

Rename a Sub-location

To change the *Location ID*, click on it in the *Plant Structure* tree, and then use one of these methods:

- Select *File* > *Rename* from the menu bar.
- Right click and select *Rename*.

A location cannot have two sub-locations at the same level with the same *Location ID* (Maximum: 50 characters).

Delete a Sub-location

Before you can delete a sub-location, you must remove all the related items. You can then use one of these methods to delete it:

- Click on the *Delete* button in the tool bar.
- Select *File* > *Delete* from the menu bar.
- Right click and select *Delete*.
- Press the Delete key on the keyboard.

You must confirm that you want to remove the item.

Tags

A tag is similar to a location but a tag can only hold one device at a time. For example: You can set up a tag for a unique device operation. If you calibrate the related device, there is a link to the device and the tag.

Create a Tag

To create a *Tag*, click on an applicable location or sub-location and use one of these methods:

- Click on the new *Tag* button in the tool bar
- Select *File* > *New* > *Tag* from the menu bar.
- Right-click and select *New* > *Tag*.

Edit a Tag

When you create a *Tag*, the Intecal software gives it the next *Tag ID* in the sequence (Figure 3-3):

Figure 3-3: *Tag Detail View*

Description: Up to 123 characters.

Loop Diagram: Up to 255 characters.

SOP (Standard Operating Procedure): Use this to set up a link to a file on your computer system (Example: PDF, TIFF, TXT, DOC).

Rename a tag

To change the *Tag ID*, click on it in the *Plant Structure* tree, and then use one of these methods:

- Select *File* > *Rename* from the menu bar.
- Right click and select *Rename*.

A location cannot have two tags at the same level with the same *Tag ID* (Maximum: 50 characters).

Delete a tag

You cannot delete a tag if it has a *Device* or a calibration record. You must remove all the related items. You can then use one of these methods to delete it:

- Click on the *Delete* button in the tool bar.
- Select *File* > *Delete* from the menu bar.
- Right click and select *Delete*.
- Press the Delete key on the keyboard.

You must confirm that you want to remove the item.

Devices

A *Device* has one or more measurement ranges. For example: pressure sensors, or measurement and test equipment. Each *Device* must a have a unique *Asset ID*.

Create a device (Manual method)

To create a *Device* manually, select the applicable location or tag for the *Device*, and then use one of these methods:

- Click on the new *Device* button in the tool bar.
- Select *File* > *New* > *Device* from the menu bar.
- Right-click and select *New* > *Device*.

You can then edit the necessary device data (Figure 3-5)

Create a device (New Device Wizard method)

(Intecal *Advanced only*) If the *Device* has a digital communication interface that the Intecal software supports, you can use the *New Device Wizard* (Figure 3-4) to set up the necessary data.

1. Connect the *Device* to the computer (refer to the user manual for the applicable *Device*).
2. Select the applicable *Location* or *Tag* for the *Device*, and then use one of these methods:

- Click on the *New Device Wizard* button in the tool bar
- Select *Tools* > *New Device Wizard* from the menu bar.

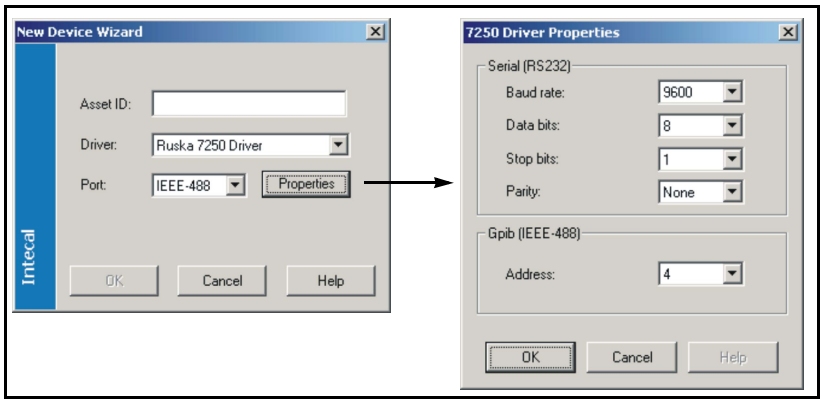


Figure 3-4: *New Device Wizard views*

3. When the *New Device Wizard* opens, set up the necessary data.

Asset ID: Enter a unique *Asset ID* (Maximum: 50 characters).

Driver: Click on the drop-down list and select the applicable device driver.

Port: Click on the drop-down list and select the communication *Port* for the *Device*.

Properties: Set the applicable communication properties (refer to the user manual for the applicable device).

4. To start the data transfer, click on the OK button in the device wizard.

If the device does not support all the data in the Intecal *Device* view (Figure 3-5), these data items stay empty. But, before you calibrate the *Device*, make sure that all the data is correct. This includes the *Device* data and the related *Ranges* (Figure 3-7).

Edit a Device

When you create a *Device* manually, the Intecal software gives it the next *Asset ID* in the sequence (Figure 3-5):

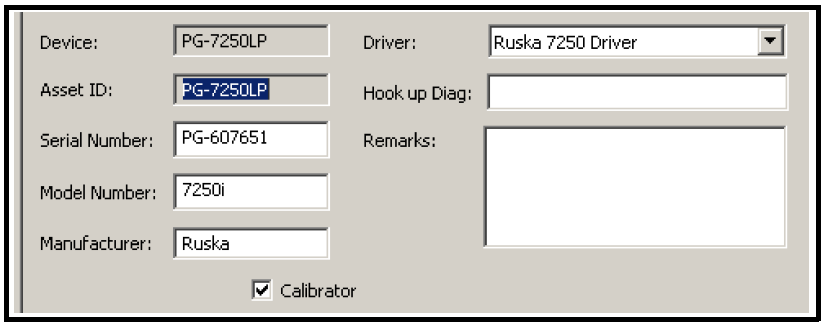


Figure 3-5: *Device Detail view*

Reference: The software uses the *Reference* name in the *Plant Structure* tree. When it is first set up, it is the same as the *Asset ID but* you can change it in the *Plant Structure* tree (Refer to Rename a Device).

Asset ID: A unique identifier for the *Device* (Maximum: 50 characters). If you change the Asset ID, use the Intecal *Save* facility to save it.

Note: If the Device has a related Work Order or a Calibration History, you cannot change the Asset ID.

Serial Number: The serial number specified by the manufacturer. To upload/download data with the Work Orders function (Chapter 6), make sure the serial number is set.

Model Number: The model number specified by the manufacturer.

Manufacturer: The manufacturer.

Driver: If applicable, click on the drop-down list and select the applicable *Device Driver.* The *Devices* you use in a *Calibration System* (Chapter 5) must have a *Device Driver.*

Hook up Diag: Use this for reference data (Up to 255 characters).

Remarks: Use this for reference data (Up to 70 characters).

Calibrator: (Intecal-Advanced only) If you use the *Device* in a hardware configuration to calibrate other *Devices* (Chapter 5), click on this box. This includes *Calibrators*, *Controllers*, *Auxiliary Devices*.

When you create a *Device*, the Intecal software automatically adds a *Maintenance Action* (Figure 3-6) and a *Range* (Figure 3-7).

Rename a device

To change the *Reference* name for a *Device*, click on it in the *Plant Structure* tree, and then use one of these methods:

- Select *File* > *Rename* from the menu bar.
- Right click and select *Rename*.

You can use the same *Reference* name for more than one device (Maximum: 50 characters).

Delete a Device

You cannot delete a *Device* if it has a calibration record. You must remove all the related records. You can then use one of these methods to delete it:

- Click on the *Delete* button in the tool bar.
- Select *File* > *Delete* from the menu bar.
- Right click and select *Delete*.
- Press the Delete key on the keyboard.

You must confirm that you want to remove the item.

Maintenance actions

When you create a *Device*, the Intecal software automatically adds a *Maintenance Action* (Figure 3-6).

Edit a maintenance action

To edit a *Maintenance Action*, use one of these methods:

- Double-click on the row.

- Click on the row and press the Enter key.
- Right-click on the row and select *Edit Row.*

Figure 3-6 shows an example of the Edit view:

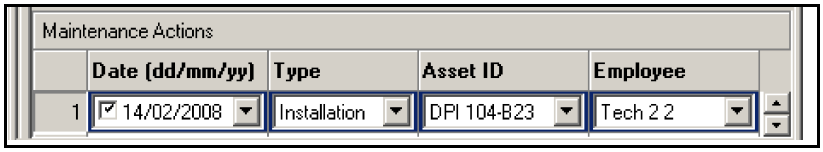


Figure 3-6: *Maintenance Action - Edit view*

Date: Click on the drop-down list to show the calendar function. Select the month/year and click on an applicable date. Use the check-box to show it is complete.

Type: Click on the drop-down list to select the type of *Maintenance Acti*on:

- Undefined
- Installation
- Calibrate
- Remove
- Inspected

Location: Click on the drop-down list to select an applicable *Location*.

Employee: Click on the drop-down list to select an applicable *Employee*.

Create a maintenance action

To create a *Maintenance Action*, use one of these methods:

- Select *File* > *New* > *Maintenance Action* from the menu bar.
- Click under *Maintenance Actions* and press the Insert key.
- Right-click under *Maintenance Actions* and select *Add Row.*

Delete a maintenance action

To delete a *Maintenance Action*, use one of these methods:

- Click on the row and press the Delete key on the keyboard.
- Right-click on a row and select *Delete Row.*

Ranges

When you create a *Device*, the Intecal software automatically adds a *Range* (Figure 3-7). A *Range* describes the measurement capabilities of the *Device*. You can add more ranges but the minimum is one.

Create a Range

If you create a *Device* with the *New Device Wizard* (Refer to Devices), the Intecal software can create the applicable number of ranges and set up the necessary data.

To create more ranges, click on the *Device* in the *Plant Structure* tree, and then use one of these methods:

- Click on the *New Range* button in the tool bar.
- Select *File* > *New* > *Range* from the menu bar.
- Right click and select *New* > *Range*.

Edit a Range

A *Range* has four tabs (Figure 3-7 to Figure 3-10):

General tab: To set up how and when the calibration is done.

Input tab and Output tab: To set up the applicable input/output values that the device uses.

Relationship tab: To set up the relationship between the input/output values.

General Tab

This tab lets you set up how and when the calibration is done. Figure 3-7 shows the data on the *General* tab:

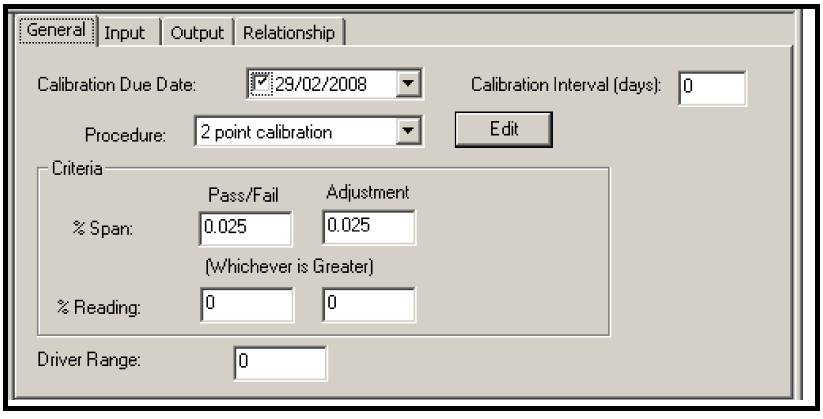


Figure 3-7: *Range General Tab*

Calibration Due Date: Click on the drop-down list to show the calendar function. Select the month/year and click on an applicable date. Use the check-box to show it is active and/or complete.

Calibration Interval (days): Enter the number of days between each calibration.

Procedure: You cannot add a *Device* to a *Work Order* if it does not have a *Procedure*. Click on the drop-down list and select the necessary calibration *Procedure* (Chapter 4). To change how the *Procedure* works, click on the *Edit* button.

Note: More than one Device can use a Procedure. Make sure that the changes you make are applicable to all the related Devices.

Criteria: Enter the necessary calibration limits for *Pass/Fail* and the permitted amount of *Adjustment* (*Adjustment %* ≤ *Pass/Fail %*). The Intecal software uses the largest value (*% Span* or *% Reading*). After a calibration, this data is permanent.

Driver Range: (Reference data) If the *Device* has more than one *Range*, set the applicable range number (1, 2, 3 ...). After a calibration, this data is permanent.

Input/Output Tab

These tabs let you set up the applicable input/output values that the device uses. Figure 3-8/3-9 shows an example of the *Input* tab and the *Output* tab for a pressure device that gives a mA output.

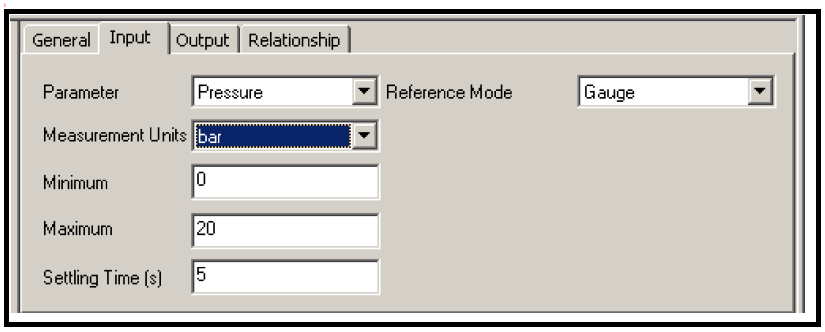


Figure 3-8: *Range Input tab*

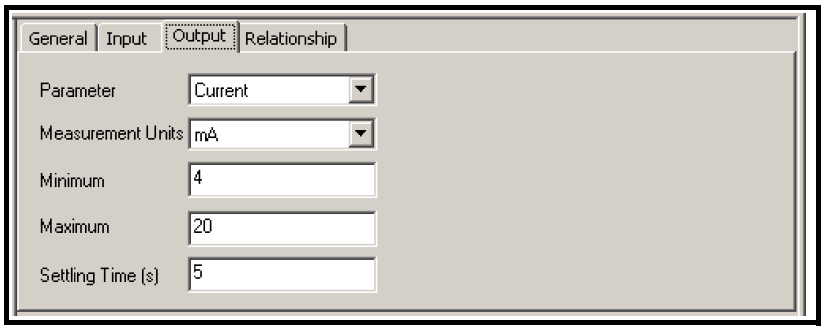


Figure 3-9: *Range Output tab*

Parameter: Click on the drop-down list and select the applicable *Parameter*. The parameters include:

- Current
- Density
- Frequency
- Humidity
- Observed *
- Pressure
- Resistance
- Switch *
- Temperature
- Temperature (RTD)
- Temperature (TC)
- Voltage

* Only available as an output parameter

Intecal adds more data items to the tab if they are necessary for the specified *Parameter*. Example: *Probe Type* for an RTD or Thermocouple. After a calibration, this data is permanent.

Measurement Units: Click on the drop-down list and select the applicable units (See Appendix A). After a calibration, this data is permanent.

Minimum/Maximum: Enter applicable values for the *Device*. After a calibration, this data is permanent.

Settling Time (s): Enter an applicable value (in seconds) that lets the *Device* give a stable reading (Value > 0). Refer to the user manual for the *Device*.

Relationship Tab

This tab let you set up the relationship between the input/output values. Figure 3-10 shows an example *Relationship* tab:

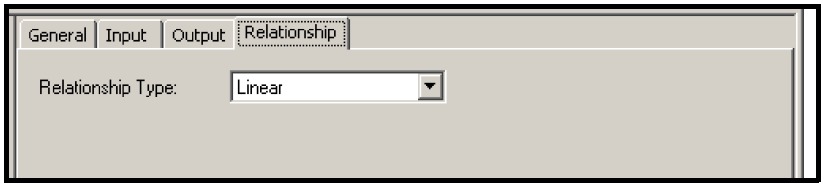


Figure 3-10: *Range Relationship tab*

Relationship Type: Click on the drop-down list and select the applicable type. These include:

- Linear: A typical straight-line relationship.
- Square Root: Flow calculations use this type of relationship. The data includes the option to set a *Break Point*.
- Switch: For switches only.

After a calibration, this data is permanent.

Delete a Range

A *Device* must have one *Range*. You cannot delete it. Also, if a *Range* has calibration records, you must remove all the related records before you can delete it. You can then use one of these methods:

- Click on the *Delete* button in the tool bar.
- Select *File* > *Delete* from the menu bar.
- Right click and select *Delete*.
- Press the Delete key on the keyboard.

You must confirm that you want to remove the item.

Copy/move items

Similar to Windows® Explorer, you can cut, copy and paste these items in the Plant Structure tree: Sub-Locations, Devices, Ranges. You can also use your mouse to drag and drop these items.

If the item includes a sub-structure, the cut, copy and paste operation will included these items as well.

Chapter 4: Calibration procedures

Introduction

Use Intecal *Procedures* to set up and manage the calibration *Procedures* in your database. A calibration *Procedure* contains the values a calibration uses (test points, ramp time). You can then use the same calibration *Procedure* for all the applicable *Devices* under test. Figure 4-1 shows the *Procedures* window.

You can use the *Procedures* function to do these tasks:

- create a *Procedure*
- edit, copy, delete or rename a *Procedure*

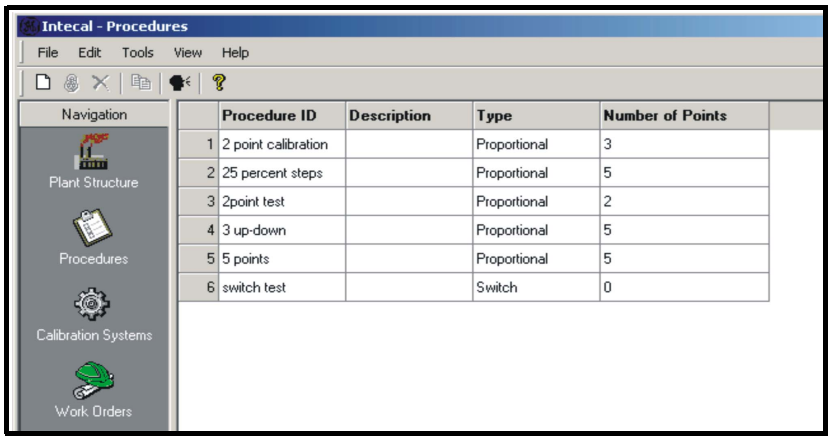
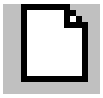


Figure 4-1: *Procedures window*

Create a procedure



To create a *Procedure*, use one of these methods:

- Click on the *New Procedure* button in the tool bar.
- Select *File* > *New Procedure* from the menu bar.
- Right-click and select *New Procedure.*

This opens the "*Procedure Creation Wizard*" (Figure 4-2).

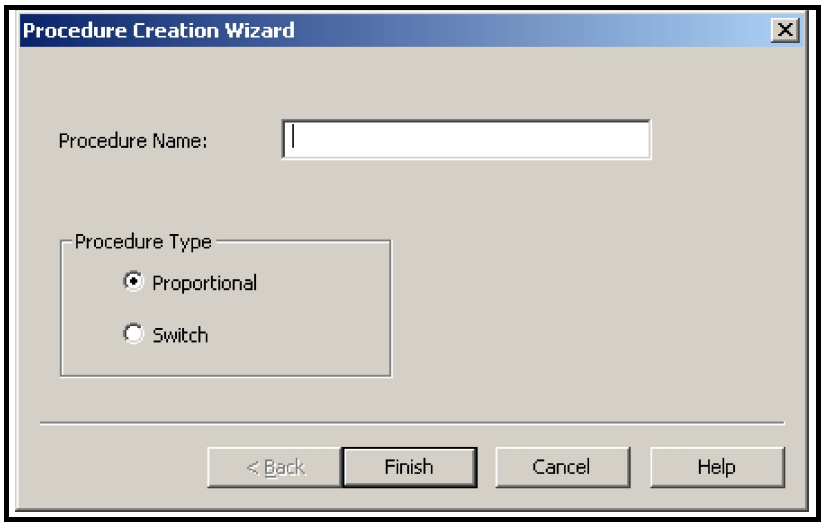


Figure 4-2: *Procedure creation wizard*

1. Enter a unique *Procedure Name* (maximum 50 characters).
2. Select the *Procedure Type*:

   Proportional: For *Procedures* with a set of test points.
   Switch: To do a switch test on a portable calibrator.

3. Click on the *Finish* button.

Edit a procedure

Note: More than one device can use a Procedure. Make sure that the changes you make are applicable to all the related Devices.

To edit a *Procedure*, select the *Procedure* in the list, and then use one of these methods to edit it:

- Select *Tools* > *Procedure Editor* from the menu bar.
- Right-click and select *Procedure Editor.*
- Double-click on the *Procedure*.

This opens the *Procedure Editor* (Figure 4-3/4-4). It has two tabs:

General tab: To set up how the *Procedure* works.

Affected Devices tab: This shows a list of devices that use the procedure.

Procedure editor for proportional procedures

Figure 4-4 shows an example of the *General* tab when the *Procedure* has a set of test points:

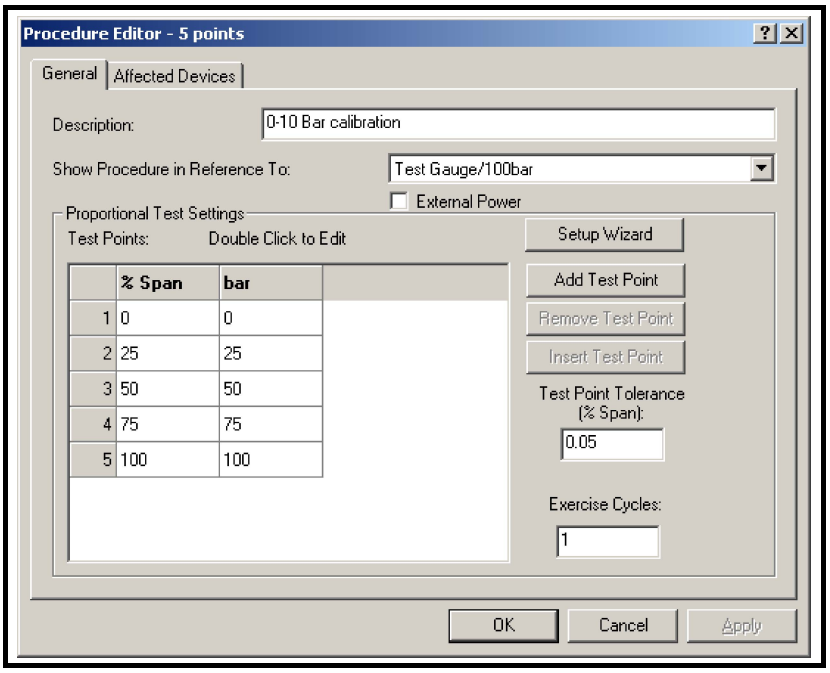


Figure 4-3: *Procedure Editor for proportional procedures*

Description: Up to 255 characters.

Show Procedure in Reference To: If you select one of the *Affected Devices* from the drop-down list, the software adds another column of test points. The new test point values are in the measurement units of the specified *Device*.

External Power: Use the check-box to show that the device must have an external power supply.

Test Points: This shows each test point as a percentage of Span. To add another column of test points, use *Show Procedure in Reference To.* To edit a test point, double-click on the value.

Setup Wizard: Click on this button to open the *Procedure Point Wizard*. Use this to create a set of test points.

Add/Remove/Insert Test Point: Click on the applicable button to add, remove or insert one test point.

Test Point Tolerance: To set an applicable calibration tolerance.

Exercise Cycles: To set the number of cycles before a test can start (for example: to get a stable operating temperature).

Procedure Editor for switch procedures

Figure 4-4 shows an example of the *General* tab when the *Procedure* is for a switch test.

Note: The Switch test is for portable calibrators only.

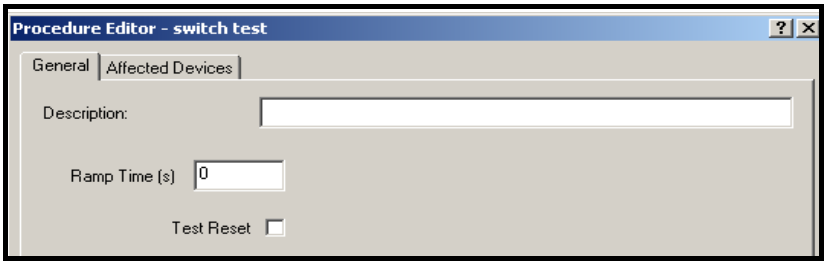


Figure 4-4: *Procedure Editor for a switch test*

Description: Up to 255 characters.

Ramp Time: Set the period (in seconds) for the portable calibrator to go from the low value to the high value.

Test Reset: Select this option to see if the switch resets correctly.

Rename a procedure

To rename a *Procedure*, select the *Procedure* in the list, and then use one of these methods to rename it:

- Select *File* > *Rename* from the menu bar.
- Right-click and select *Rename*.

Copy a procedure

To copy a *Procedure*, select the *Procedure* in the list, and then use one of these methods to copy it:

- Click on the *Copy* button in the tool bar.
- Select *Edit* > *Copy* from the menu bar.
- Right-click and select *Copy.*

A window opens for you to enter a new *Procedure ID*.

Delete a procedure

To delete a *Procedure*, select the *Procedure* in the list, and then use one of these methods to delete it:

- Click on the *Delete* button in the tool bar.
- Select *File* > *Delete* from the menu bar.
- Right-click and select *Delete.*
- Press the delete key on the keyboard.

You must confirm that you want to delete the *Procedure*.

Note: If a Device uses the Procedure, you cannot delete it.

Chapter 5: Calibration systems

(Intecal-Advanced only)

Introduction

Use Intecal *Calibration Systems* to manage the hardware configurations you use to do your calibrations. A *Calibration System* includes the *Devices* you use in the hardware configuration and the applicable *Device Variables* that control the calibration.

You can then use the same *Calibration System* for all the applicable *Devices* under test (Chapter 7). Figure 5-1 shows the *Calibration Systems* window.

You can use the *Calibration Systems* function to do these tasks:

- create a *Calibration System*
- edit, copy, delete or rename a *Calibration System*

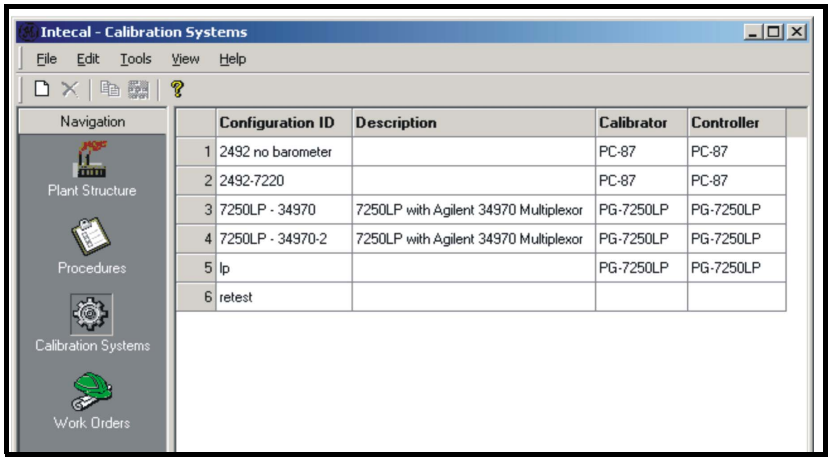
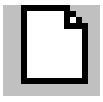


Figure 5-1: *Calibration Systems window*

Create a Calibration System



To create a *Calibration System*, use one of these methods:

- Click on the *New Calibration System* button in the tool bar.
- Select *File* > *New Calibration System* from the menu bar.
- Right-click and select *New Calibration System.*
- When you start a calibration (Chapter 7), click on the *New Calibration System* button.

This opens the "*Calibration System Creation Wizard*" (Figure 5-2).

Wizard - Page 1

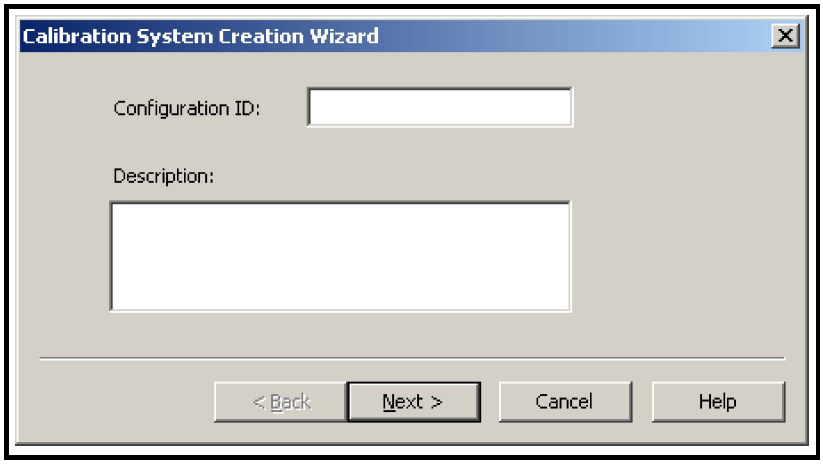


Figure 5-2: *Calibration System Creation Wizard - Page 1*

1. Enter a unique *Configuration ID* (Maximum: 50 characters).
2. If necessary, enter a *Description* (Maximum: 164 characters)
3. Click on the *Next* button (Figure 5-3).

Wizard – Page 2

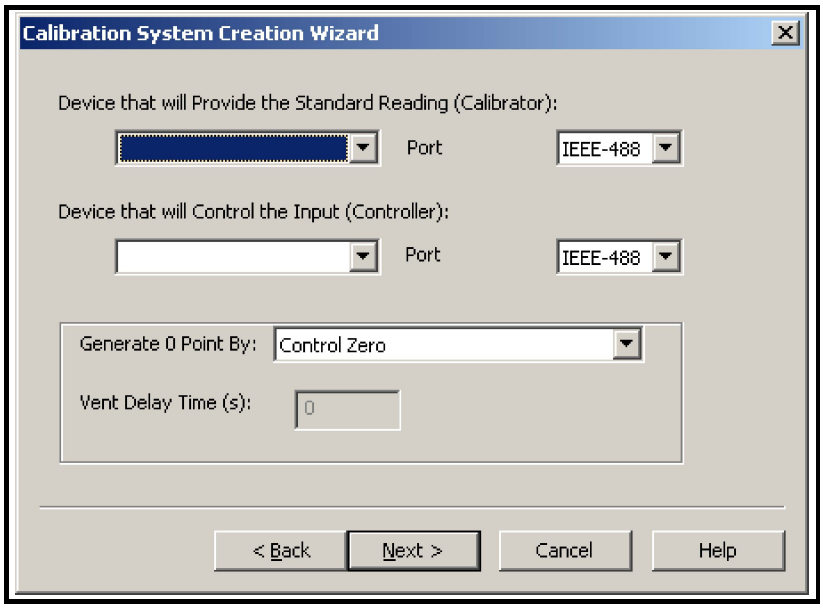


Figure 5-3: *Calibration System Creation Wizard - Page 1*

1. Enter the applicable values:

Device ... (Calibrator): Click on the drop-down list and select the applicable *Calibrator Device* (Chapter 3): This is the *Device* that reads the standard values used in the calibration.

Device ... (Controller): Click on the drop-down list and select the applicable *Controller Device* (Chapter 3): This is the *Device* that controls the standard values used in the calibration.

Note: The Calibrator and the Controller can be the same Device.

Port: Click on the drop-down list and select the communication *Port* for each *Device*.

Generate 0 Point By: If applicable, click on the drop-down list and select the method to set a zero pressure value:

- *Control Zero*: The *Controller* takes the pressure to zero.
- *Vent*: The *Controller* vents the pressure to atmospheric pressure.

  Vent Delay Time (s): If applicable, enter the time interval (in seconds) before the system vents to atmospheric pressure.

- *Draw Vacuum*: A vacuum pump reduces the pressure to an approximate absolute zero.

2. When the values are set up, click on the *Next* button (Figure 5-4).

Wizard – Page 3

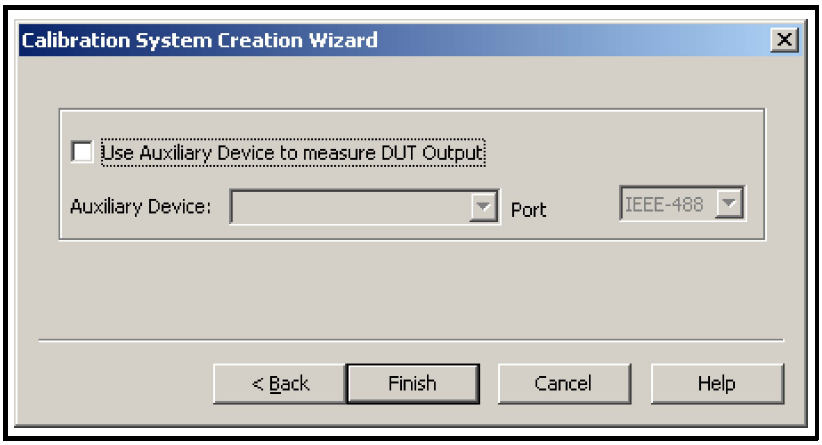


Figure 5-4: *Calibration System Creation Wizard - Page 3*

Enter the applicable values or click on the *Finish* button:

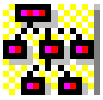
Use Auxiliary Device ... Output: If there is an auxiliary *Device* (Example: a multimeter) to read the output of the device under test (DUT), click on this check-box.

Note: If you do not set an Auxiliary Device, you must enter the necessary data during the calibration.

Auxiliary Device: Click on the drop-down list and select the applicable *Calibrator Device* (Chapter 3).

Port: Click on the drop-down list and select the communication *Port* for the *Device*.

Edit a Calibration System



Note: More than one Device can use a Calibration System. Make sure that the changes you make are applicable to all the related Devices.

To edit a *Calibration System*, select the applicable *Calibration System* in the list, and then use one of these methods to edit it:

- Click on the *Cal System Configurator* button in the tool bar.
- Select *Tools* > *Cal System Configurator* from the menu bar.
- Right-click and select *Cal System Configurator.*
- Double-click on the *Calibration System*.

This opens the *Calibration System Configurator* (Figure 5-5).

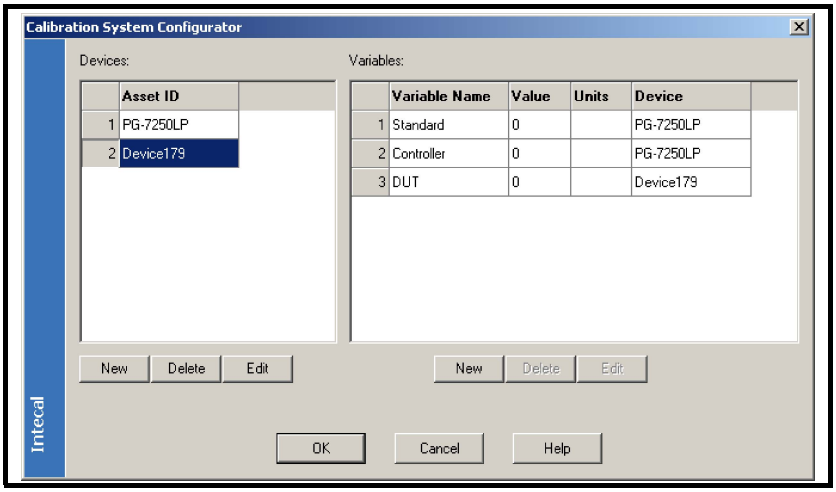


Figure 5-5: *Calibration System Configurator*

There are two lists:

Devices: Use this list to set up and change the *Devices* you use to do the calibration.

Variables: Use this list to set up and change how the *Calibration System* uses the *Variables* to do the calibration.

Add, edit, delete calibration devices

To change the *Devices* in the *Calibration System*, click the applicable button to add, edit, or delete a *Device*. To edit an item, you can also double-click on it.

You can only add a *New Device* if is set up with a *Device Driver* (Figure 3-4 /3-5). When you add a *New Device*, it must have a specified communications port. Use the drop-down list to select one.

Note: When you edit a Device to change the communications port, the software tries to communicate with it. Make sure that the Device has a connection to the PC.

Add, edit, delete calibration variables

To change the *Variables* in the *Calibration System*, click the applicable button to add, edit, or delete a *Variable*. To edit an item, you can also double-click on it.

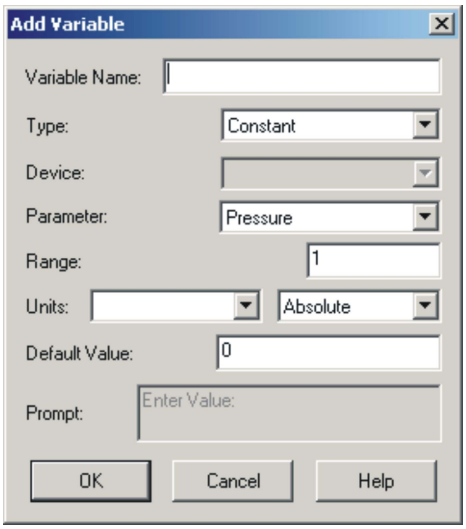


Figure 5-6: *Data for a Variable*

Variable Name: Enter a unique *Name* (maximum 50 characters).

Type: Click on the drop-down list and select the applicable type for this *Variable*. These include:

- Automated: A specified *Device* supplies the *Variable* value (Specified in *Device:*).
- Constant: It is a constant value (Specified in *Default Value:*).
- Manual: During the calibration a *Prompt* asks you to supply the necessary value (The text is specified in *Prompt:*).

Device: (Automated Variables only). Click on the drop-down list and select the applicable *Calibrator Device* (Chapter 3).

Parameter: Click on the drop-down list and select the applicable *Parameter.* See Appendix A, Table A-2.

Range: (Automated Variables only). If the *Device* has more than one *Range,* set the applicable range number (1, 2, 3 ...).

Units: Click on the drop-down list and select the applicable units. See Appendix A, Table A-2.

Default Value: (Constant Variables only) Enter an applicable constant value.

Prompt: (Manual Variables only) Enter the applicable text to ask the operator for a value during the calibration.

Rename a calibration system

To rename a *Calibration System*, select the *Calibration ID* in the list, and then use one of these methods to rename it:

- Select *File* > *Rename* from the menu bar.
- Right-click and select *Rename.*

Copy a calibration system

To copy a *Calibration System*, select the *Configuration ID* in the list, and then use one of these methods to copy it:

- Click on the *Copy* button in the tool bar.
- Select *Edit* > *Copy* from the menu bar.
- Right-click and select *Copy.*

A window opens for you to enter a new *Calibration System ID*. Default: “Copy of XYZ” (XYZ is the ID you are copying).

Delete a calibration system

To delete a *Calibration System*, select the *Configuration ID* in the list, and then use one of these methods to delete it:

- Click on the *Delete* button in the tool bar.
- Select *File* > *Delete* from the menu bar.
- Right-click and select *Delete*.
- Press the delete key on the keyboard.

You must confirm that you want to delete the *Calibration System*.

Chapter 6: Work Orders

Introduction

Use Intecal *Work Orders* to manage your calibration work. Figure 6-1 shows the *Work Orders* window.

You can use the *Work Orders* function for these tasks:

- Create a new *Work Order* and set up a schedule of work for specified employees. To help you, a Query function can show you all the calibrations that are due in a specified period.
- Change the *Work Order*, or delete it.
- Upload and download data (*Procedures*, calibration results) to and from portable calibrators that have a serial communications function or an IEEE 488 interface (Druck, Ruska, or FCINTF).
- Close a *Work Order* and, if necessary, examine its history.
- Chapter 7: Manage the calibration records for *Devices* that do not have a serial communications function or an IEEE 488 interface (*Manual Data Entry*).
- Chapter 7: (Intecal-Advanced only) Calibrate a *Device* that has a serial communications function or an IEEE 488 interface (Druck, Ruska, or FCINTF).

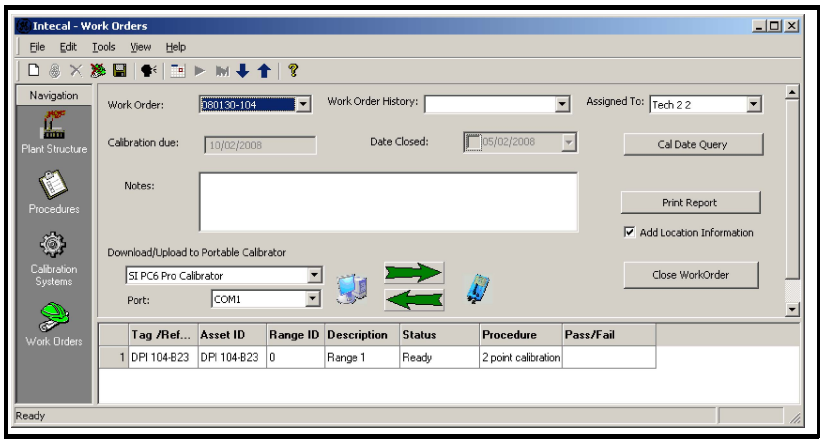
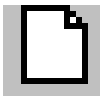


Figure 6-1: *Work Order window*

Create a new Work Order



To create a *Work Order*, use one of these methods:

- In the *Work Orders* window, click on the *New* button in the tool bar.
- In the *Work Orders* window, select *File* > *New* from the menu bar.
- In the *Plant Structure* window:
  a. Right-click on an item and select *Add to Work Order.*
  b. When the *Add to Work Order* window opens, click on the *New Work Order* button.

You must enter a unique *New Work Order ID* and click on the OK button. You can then set up your *Work Order* data.

Set up your Work Order data.

To set up what is done in a *Work Order* you need to add *Devices* to it. You can also add *Employee* data and work instructions.

Add Devices to a Work Order

You can add *Devices* to a *Work Order*, from the *Work Order* window or from the *Plant Structure* window.

In the *Work Orders* window:

- Click on the *Cal Date Query* button. This facility lets you set calendar limits for *Devices* that are overdue for calibration. You can then move the applicable *Devices* into a *Work Order.* See Figure 6-2.
- Select *Tools* > *Get Overdue Items* from the menu bar. The software uses the *Calibration Due Date* for each *Device* to add ALL the applicable items to the *Work Order.*

In the *Plant Structure* window, you must select an item from the *Plant Structure* tree (*Location, Sub-Location, Tag, Device, Range*), and then use one of these methods:

- Click on the *Add To Work Order* button in the tool bar.
- Select *Tools* > *Add To Work Order* from the menu bar.
- Right-click on the item and select *Add to Work Order.*

A drop-down list lets you add the item to an applicable *Work Order.* When you click on the *OK* button, the software adds all the related *Devices* to the specified *Work Order.*

Note: If a Device is not set up with the necessary Range data (Parameter, Procedure), the software ignores it.

Setup procedure (Cal Date Query)

1. In the *Work Orders* window (Figure 6-1), click on the *Cal Date Query* button. See Figure 6-2. The window shows all the applicable *Devices* in the *Query Results* panel.
2. Use one of these options to set the calendar limits for *Devices* that are overdue for calibration:

Calibration Window ... ▼: Set the number of months (1 to 6).

Calibration Due Date between ... ▼ and ... ▼: Click on the drop-down list to show the calendar function. Select the month/year and click on an applicable date.

Show Overdue: Click on this button to show ALL the *Devices* that are overdue for calibration.

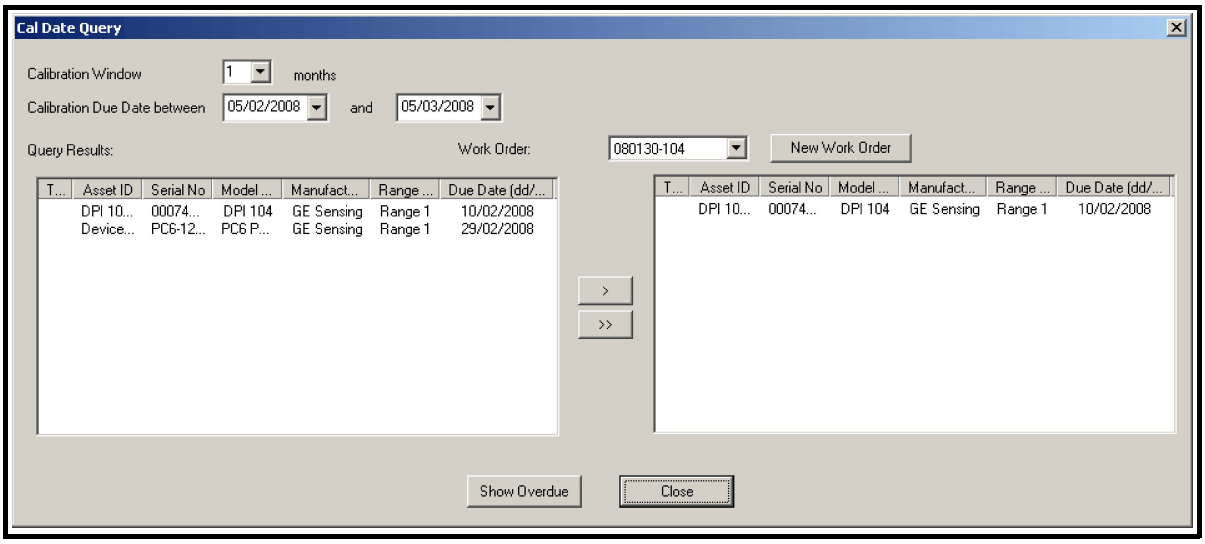


Figure 6-2: *Calibration History*

3. Set the *Work Order* you want to use:

- For an available *Work Order*, click on the drop-down list ... ▼.
- For a new *Work Order*, click on the *New Work Order* button. You must enter a unique *New Work Order ID* and click on *OK*.

4. To move the applicable *Devices* into the specified *Work Order*:

- For one *Device* at a time, select the *Device* in the left-hand panel and click on >.
- For ALL the *Devices* in the left-hand panel, click on >>.

5. When the *Work Order* is complete, click on *Close*.

Add instructions to a Work Order

In the *Work Orders* window (Figure 6-1), select the applicable *Work Order* from the drop-down list. You can then add the necessary instructions:

Assigned to: (Administrator/Supervisor only) Click on the drop-down list to select an applicable *Employee*.

Calibration Due /Date Closed: The *Calibration Due* date is set up with the *Device* data (Chapter 3, Figure 3-7). *Date Closed* is set when you use the *Close WorkOrder* button.

Notes: Up to 260 characters.

Work Order reports

To get a *Work Order* report that shows all the related *Devices* and the current status:

1. In the *Work Orders* window (Figure 6-1), select the applicable *Work Order* from the drop-down list.
2. To include *Device* locations in the report, click on the check-box.
3. Click on *Print Report* > See Figure 6-3.

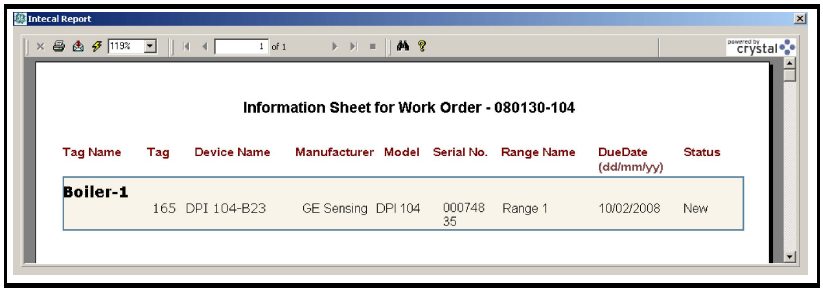


Figure 6-3: *Example Work Order report*

4. You can print the file and/or export the file in a different format (Table 6-1).

Table 6-1: *Report window - Tool bar*

Item	Operation
	To set up the printer and print the report.
	To export the file in a different format. You can set the applicable format, filename and location. Formats: Portable Document Format (PDF), Microsoft Word, Microsoft Excel, Text file (with tab separators).
	To refresh the contents of the display.
	To go to the first or last page.

Table 6-1: *Report window - Tool bar (Continued)*

	To go to the previous or next page.
	To find text in the report.

Delete items from a Work Order

To delete an item from a *Work Order*:

1. In the *Work Orders* window (Figure 6-1), select the applicable *Work Order* from the drop-down list.
2. Click on the applicable item in the *Work Order* list, then use one of these methods to delete it:

- Click on the *Delete* button in the tool bar.
- Select *File* > *Delete* from the menu bar.

Delete a Work Order

To delete a *Work Order,* Select the applicable *Work Order* from the drop-down list, and then use one of these methods to delete it:

- Click on the *Delete Work Order* button in the tool bar.
- Select *File* > *Delete Work Order* from the menu bar.

Upload/download data

To upload and download data (*Procedures*, calibration results) to and from a portable calibrator, connect the *Device* to the applicable communication port (COM port or IEEE-488 interface).

Note: The portable calibrator must have the necessary serial communications function or an IEEE 488 interface (Druck, Ruska, or FCINTF).

Then:

1. In the *Work Order* window (Figure 6-1), select the *Work Order* from the drop-down list.
2. In *Download/Upload to ...*, click on the applicable drop-down list and select the necessary portable calibrator driver and the communication port.

3. Click on the download button to download the procedure.

Download button in the tool bar

Download button in the *Work Order* window

Note: To prevent error messages, make sure the data you download includes the correct serial number for each Device. See Chapter 3, Figure 3-5.

4. Do the necessary calibration:

- Intecal-Advanced calibration - Refer to Chapter 7.
- Local calibration methods - Refer to the applicable local calibration procedures.

5. Click on the upload button to upload the results.

Upload Button in the tool bar

Upload Button in the *Work Order* window

6. If the data you upload includes a *Device* serial number that is not in the Intecal database, the software gives you two options (Figure 6-4):

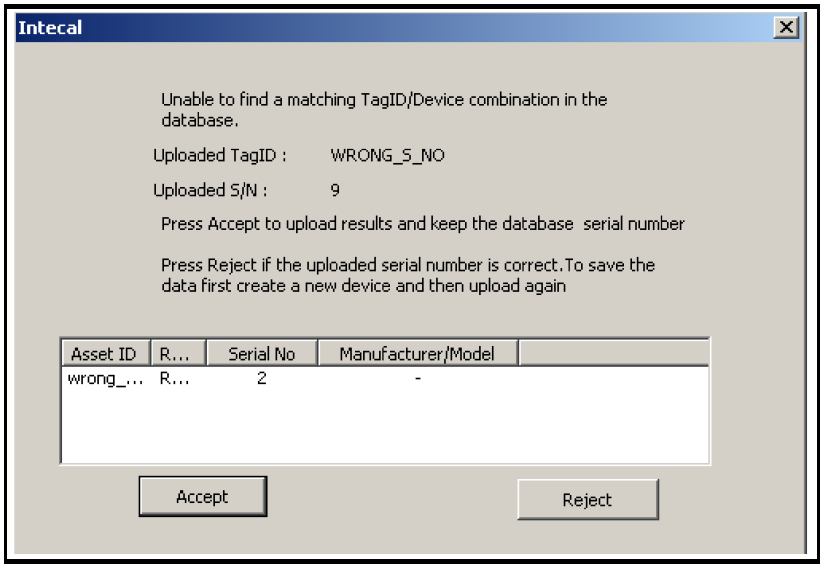


Figure 6-4: *Example display - Accept/Reject uploaded serial number*

- **Accept:** To accept the results but use them with the specified *Device* serial number in the database.
- **Reject:** To reject the results. The serial number in the uploaded data is correct.

7. If you *Reject* the results, set up a *New Device* with the applicable serial number (Chapter 3) and then do the upload again.

Close a Work Order

When all the *Device* calibrations for a *Work Order* are at status *Completed*, you can close it and start again with all *Devices* at status *Ready.*

Note: You cannot close a Work Order if there is a Device with status Ready or Downloaded.

1. In the *Work Orders* window (Figure 6-1), select the applicable *Work Order* from the drop-down list.
2. Click on *Close WorkOrder.* The message window gives three options:

- **Yes:** To save the *Work Order* in the format workorder_datetime (Example: ABC123456_05-Feb-200814:51).

  When you save a *Work Order*, you can use the *Work Order History* drop-down list to examine its calibration history.

- **No:** To close the *Work Order* and not save it.
- **Cancel:** To leave the *Work Order* unchanged.

3. If you click on *Yes*, the software saves the *Work Order* and you see the workorder_datetime in the *Work Order History.*

See the Work Order History

To see the records in your *Work Order History*:

1. In the *Work Orders* window (Figure 6-1), select the applicable *Work Order* from the drop-down list.
2. Click on the *Work Order History* drop-down list and select a record (if available).
3. To see the calibration history for a *Device*, double click on the applicable row. See Chapter 7, Figure 7-1.

Chapter 7: Calibration

Introduction

You can use the Intecal software for these calibration tasks:

- To see the *Calibration History* for a *Device* or *Range*. You can also make a permanent record of each calibration report. For example: For ISO 9000 quality control procedures.
- To manage the calibration records for *Devices* that do not have a serial communications function or an IEEE 488 interface (*Manual Data Entry*).
- (Intecal-Advanced only) To calibrate a *Device* that has a serial communications function or an IEEE 488 interface (Druck, Ruska, or FCINTF).
- (Intecal-Advanced only) Calibration adjustment: Set up automatic calibration systems to make full use of your GE calibrators and controllers (Ruska and Druck) or alternative systems with an FCINTF facility.

Calibration history

If a *Device* or *Range* has a *Calibration History*, you can see each set of results on the screen.

If you have the correct Permission level (Administrator / Supervisor), you can give final approval to a set of results. You can then make a permanent record of each calibration report with an applicable address and/or company logo.

To see the *Calibration History,* use one of these methods:

- In the *Plant Structure* window:

1. Click on the related *Tag*, *Device* or *Range.*
2. Click on the *Calibration History* button in the tool bar. OR

   Select *Tools* > *Calibration History* from the menu bar.

- In the *Work Orders* window:

  If a *Device* in a *Work Order* has status *Completed*, you can double click on it to see the *Calibration History. OR*

  If a Work Order is closed, click on the *Work Order History* drop-down list and select a record. See Chapter 6.

Figure 7-1 shows an example of the *Calibration History* window.

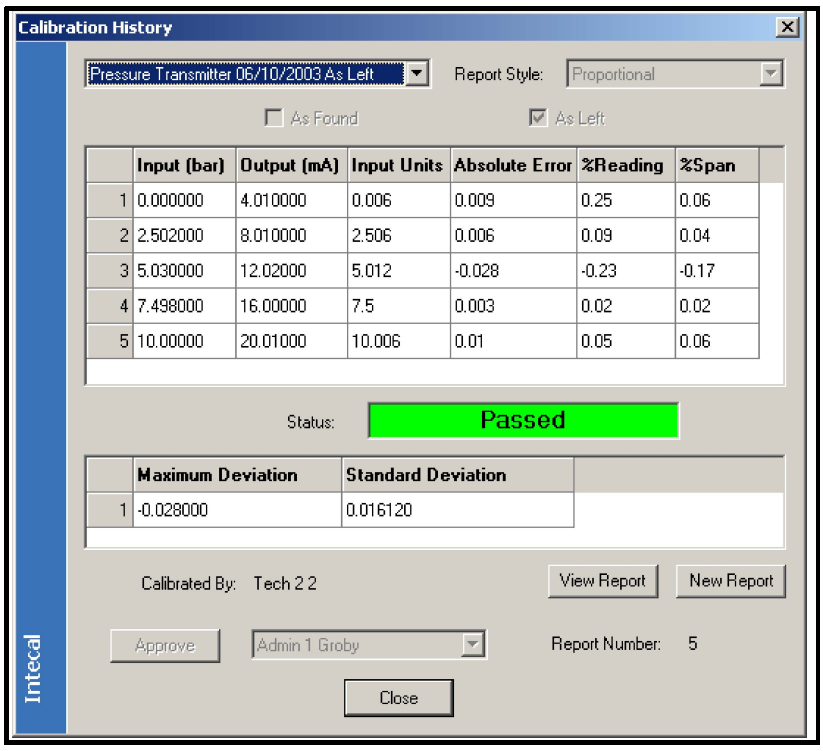


Figure 7-1: *Calibration History*

3. If there is more than one record, click on the drop-down list (left-hand side) and select the calibration record you want to see.

Calibration History records

A typical *Calibration History* record includes these items:

As Found/As Left: This shows the type of results:

- *As Found*: The values before adjustment.
- *As Left*: The values after the checks/adjustments.

Report Style: There are two types:

- *Proportional*: The report includes all the calibration data.
- *Proportional-Blank*: The report shows the *Device* data but no calibration data.

Input (...), Output (...) : The type of *Device*, and the *Procedure* you use controls the type of data in the calibration record. To calculate the error values for each test point (Absolute Error, %Reading, %Span), the software uses the specified *Device* pass/fail and adjustment criteria (Chapter 3).

The software has three categories for the calibration results:

- *Passed*: The test point values have a white background.
- *Needs Adjustment*: The test point values have a yellow background.
- *Failed*: The test point values have a red background.

Status: *Passed* (Green) - All the test points are in the specified limits for the *Device*.

Needs Adjustment (Yellow) - Some of the test points are not in the specified limits but they are in the limits for adjustment.

Failed (Red) - The equipment is unserviceable. For example: It must go back to the manufacturer or to a calibration laboratory.

Maximum/Standard Deviation: The software calculates these values for information only.

Calibrated by: The *Employee* that did the calibration.

Approve: (Administrator/Supervisor only) If the results are correct and the approval is not set, click on the *Approve* button. The approval is permanent.

View Report: After approval, you can click on this button to see the contents of the calibration report and make a permanent record (electronic or paper).

New Report: After approval, you can click on this button to add comments to the report. To see the new report with the comments, click on OK.

Calibration History reports

If you use the *View Report* or *New Report* buttons (Figure 7-1), the Intecal *Report* window opens (Figure 7-2). You can print the file and/or export the file in a different format. See Chapter 6, Table 6-1.

If the *Report Style* is set to *Proportional*, there are two pages:

- Page 1 has the necessary *Device* and calibration data (Figure 7-2).
- Page 2 shows the calibration results in a graph (Figure 7-3).

To set up your calibration reports with a company logo, a company address and standard footer text, refer to Chapter 2, Figure 2-8.

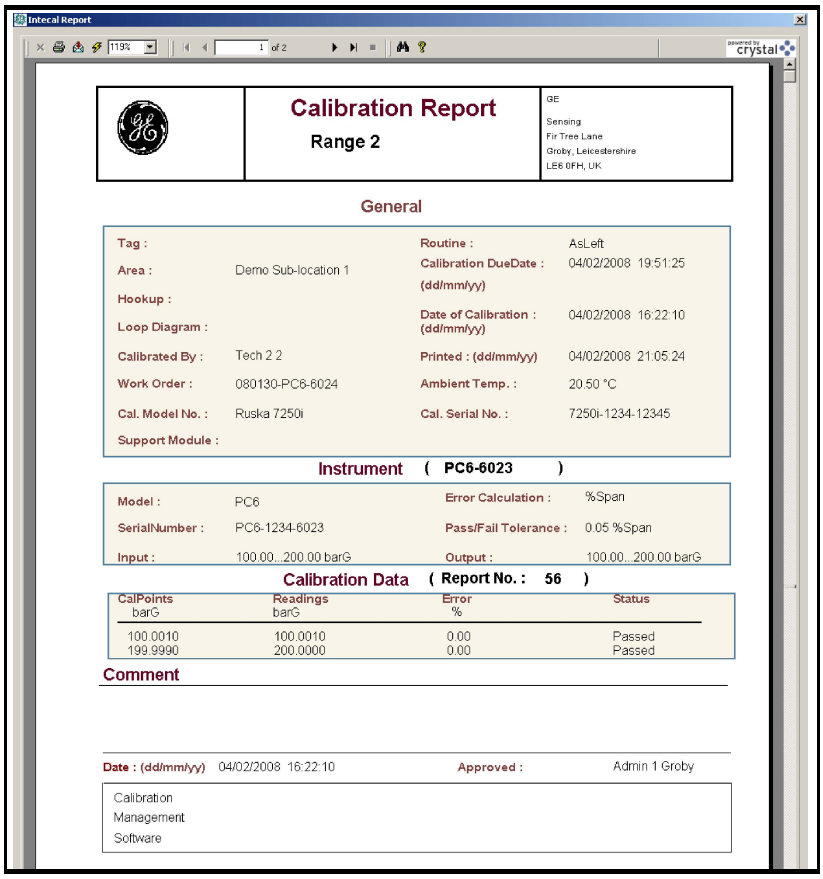


Figure 7-2: *Example calibration report (Page 1 - Data)*

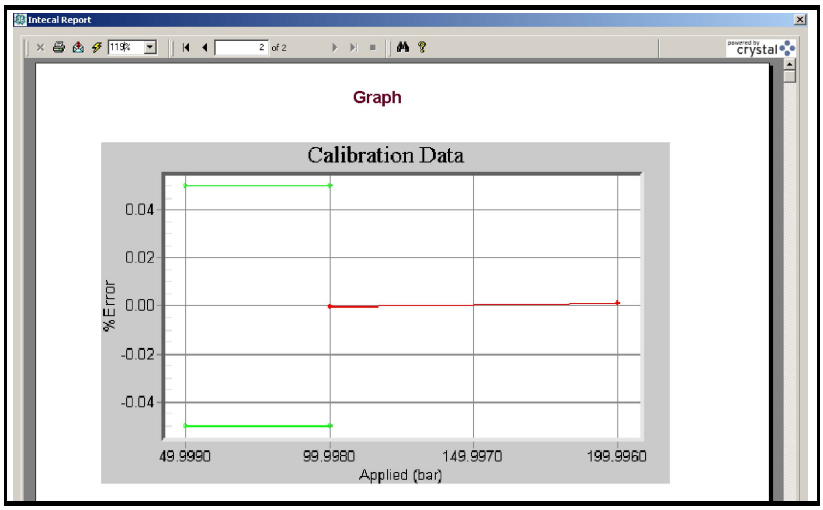


Figure 7-3: *Example calibration report (Page 2 - Graph)*

On the *Graph*, green lines show the Pass/Fail limits.

Calibration - Manual Data Entry

If you are using a calibrator that does not have a serial communications function, you can add calibration results to your Intecal database manually:

1. In the *Work Order* window (Figure 7-4), select a *Work Order* from the drop-down list.

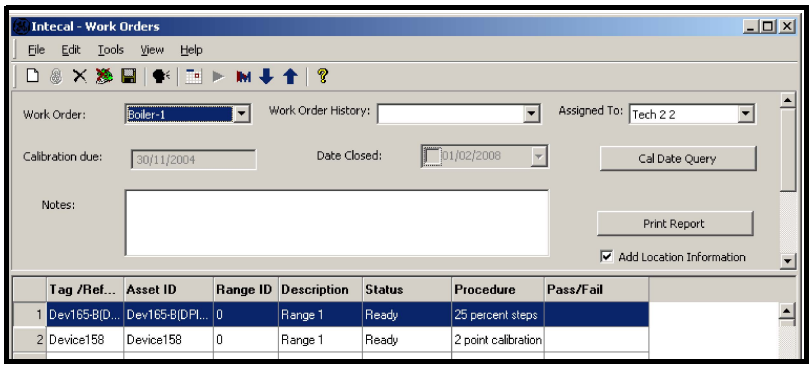

Intecal - Work Orders
File Edit Tools View Help
Work Order: Boiler-1
Work Order History:
Assigned To: Tech 2 2
Calibration due: 30/11/2004
Date Closed: 01/02/2008
Cal Date Query
Notes:
Print Report
Add Location Information
Tag /Ref... Asset ID Range ID Description Status Procedure Pass/Fail
1 Dev165-B(D... Dev165-B(DPI... 0 Range 1 Ready 25 percent steps
2 Device158 Device158 0 Range 1 Ready 2 point calibration

Figure 7-4: *Work Order - Manual Data Entry*

2. Select the applicable *Device* from the *Work Order* list of *Devices*.
3. Click on the *Manual Data Entry* button in the tool bar. This opens the *Manual Data Entry* window (Figure 7-5).

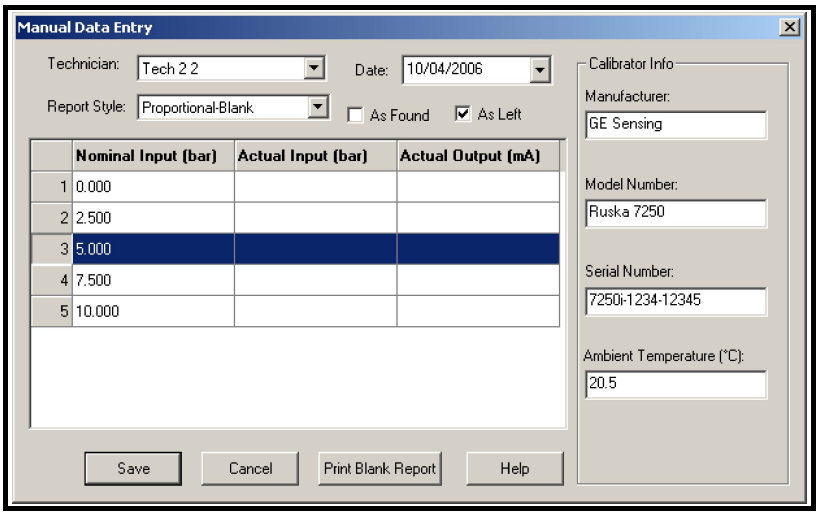


Figure 7-5: *Manual Data Entry window*

4. Add the necessary data:

Technician: Click on the drop-down list to select an applicable *Employee*.

Date: Click on the drop-down list to show the calendar function. Select the month/year and click on an applicable date.

As Found/As Left: Use the check-boxes to show the type of results:

- *As Found*: The values before adjustment.
- *As Left*: The values after the checks/adjustments are complete.

Nominal Input (...), Actual Input (...): The type of *Device*, and the *Procedure* you use controls the type of data in the calibration record. Click on a box and enter the applicable values.

Calibrator Info: To make sure that the calibration is traceable to the necessary standards, identify the calibrator used to do the calibration (Manufacturer, Model Number ...).

Print Blank Report: Click on this button to see a report with the *Device* data but no calibration data.

5. To complete the calibration, click on *Save*.
6. Please confirm ... Yes/No: Click on Yes to accept the data.

Calibration - Automatic

(Intecal-Advanced only) Use this function to calibrate a *Device* or a *Range*.

Before you start:

- Read and understand the “Safety” section.
- Make sure the *Device* is set up with the necessary *Range* data (Chapter 3).
- Make sure that there is a connection between the PC communications port and the applicable test equipment.

When all the connections are correct, you can do the automatic calibration from the *Plant Structure* window or from the *Work Order* window.

Automatic calibration - Plant Structure window

To do a calibration from the *Plant Structure* window (Chapter 3):

1. Select an item in the *Plant Structure* tree, and use one of these methods to start the calibration:
   - Click on the *Calibrate* button in the tool bar.
   - Select *Tools* > *Calibrate...* from the menu bar.
   - Right-click and select *Calibrate...* .

2. When the *Select Calibration System* window opens (Figure 7-6), select an applicable *Calibration System* from the drop-down list or click on the *New Calibration System* button.

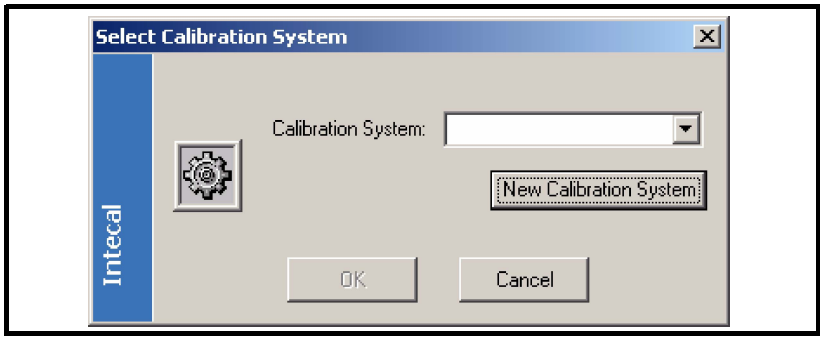


Figure 7-6: *Select Calibration System window*

Note: A Calibration System Creation Wizard (Chapter 5) helps you set up a new Calibration System.

3. When the *Calibration System is correct,* click on OK. This opens the "*Calibration*" window (Figure 7-7).

Automatic calibration - Work Order window

To do a calibration from the *Work Order* window (Chapter 6):

1. Select the *Work Order* from the drop-down list.
2. Use these methods to select the applicable items from the *Work Order*:
   - Select *Edit* > *Select All* (*Deselect All*) from the menu bar. All selections have a green background.
   - Click on an item and, if necessary, select *Edit* > *Select* (*Deselect*) from the menu bar.
3. Use one of these methods to start the calibration:
   - Click on the *Calibrate* button in the tool bar.
   - Select *Tools* > *Calibrate...* from the menu bar.
4. When the *Select Calibration System* window opens (Figure 7-6), select an applicable *Calibration System* from the drop-down list or click on the *New Calibration System* button.

Note: A Calibration System Creation Wizard (Chapter 5) helps you set up a New Calibration System.

5. When the *Calibration System is correct,* click on OK. This opens the "*Calibration*" window (Figure 7-7).

Calibration window

Figure 7-7 shows the *Calibration* window that opens:

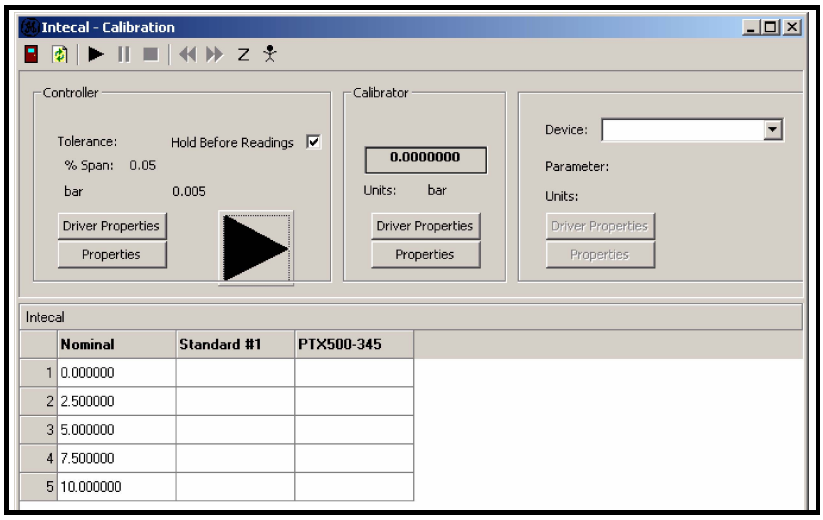


Figure 7-7: *Calibration window*

Controller/Calibrator: Specified by the *Calibration System* (Chapter 5).

Tolerance: Specified by the *Procedure* set up for the *Device Range* (Chapter 3).

Hold Before Readings: If you want to stop and examine the data before each reading, click on this check-box.

Device: Click on the drop-down list and select the *Device* you want to calibrate.

Driver Properties: To examine or change the applicable communication properties (Controller, Calibrator, Device), click on this button. Refer to the user manual for the applicable *Device*.

Properties: To examine the applicable *Device* properties (Controller, Calibrator, Device), click on this button.

The large “Play” button and the tool bar at the top of the screen lets you select the applicable calibration task (Table 7-1).

Table 7-1: *Calibration window - Tool bar*

Item	Operation
	Exit: Leave the calibration screen.
	Refresh: Update the data on the screen.
	Play: Start the calibration.
	Pause: Stop the calibration temporarily. To continue, click on “Pause” again.
	Stop: Stop the calibration completely.
	Redo: Go back and do the previous test point again.
	Skip: Go to the next test point.
	Zero: Set the *Device* to zero.
	Exercise: Make sure that the *Device* works correctly and to get a stable operating temperature.

The bottom half of the screen shows the calibration results:

Nominal: Shows the calibration values specified by the *Procedure* (Chapter 3).

Standard: Shows the applied calibration values.

XXX: (Applicable *Device ID*) Shows the reading that the specified *Device* gives back.

Calibration - Adjustment

(Intecal-Advanced only) Use this function to make calibration adjustments to a *Device* or a *Range*.

Before you start:

- Read and understand the “Safety” section.
- Make sure each *Device* is set up with the necessary *Range* data (Chapter 3).
- Make sure that there is a connection between the PC communications port and the applicable test equipment.

To make calibration adjustments:

1. Select a *Device* or *Range* in the *Plant Structure* tree (Chapter 3), and use one of these methods to start the *Adjustment Cycle*:
   - Click on the *Adjustment Cycle* button in the tool bar.
   - Select *Tools* > *Adjustment Cycle* from the menu bar.
2. When the *Select Calibration System* window opens (Figure 7-6), select an applicable *Calibration System* from the drop-down list or click on the *New Calibration System* button.

Note: A Calibration System Creation Wizard (Chapter 5) helps you set up a new Calibration System.

3. When the *Calibration System is correct*, click on OK. This opens the "*Calibration*" window (Figure 7-8).

Calibration window (Adjustment)

Figure 7-8 shows the *Calibration* window for the *Adjustment Cycle*. This is almost the same as the normal Calibration window. Refer to Figure 7-7 and the related text.

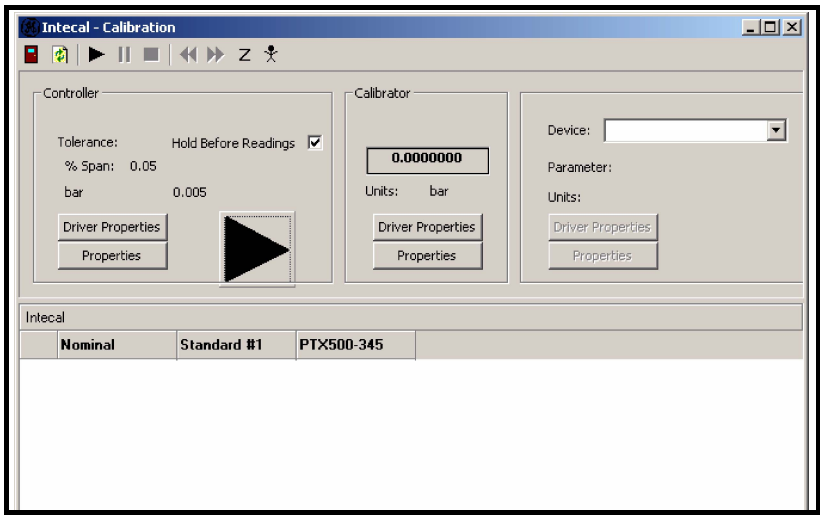


Figure 7-8: *Calibration window (Adjustment)*

Appendix A: Parameters and units

Parameters and units for Devices

Table A-1 gives a list of the available *Parameters* and *Units* that you can use when you set up a Device (Chapter 3, Figure 3-5).

Table A-1: *Parameters and units for Devices*

Parameter	Available units		
Current	mA		
Density	g/cm^3		
Frequency	hertz		
Humidity	%RH		
Pressure	atm	in H2O @ 0°C	kPa
	bar	in H2O @ 20°C	lb/ft2
	cm H2O @ 4°C	in H2O @ 25°C	mbar
	cm H2O	in H2O @ 4°C	mH2O
	cm Hg @ 0°C	in H2O @ 60°C	mHg
	cm Hg	inH2O	mm H2O @ 4°C
	ftH20 @ 20 °C	inH2O @ 60°F	mmH2O
	ftH2O	inHg	mmHg
	ftH2O @ 4°C	inHg @ 0°C	mmHg @ 0°C
	ftH2O @ 60°C	inHg @ 60°F	MPa
	hPa	kg/cm2	Pa
		kg/m2	psi
		kgf/cm2	Torr
Resistance	kOhm	Ohm	
Temperature	°C	°R	
	°F	°K	
Voltage	mV	V	
Observed *	User specified		
Switch *	Set by the input		

* Only available as an output parameter

Parameters and units for Variables

(For Intecal-Advanced only) Table A-2 gives a list of the available *Parameters* and *Units* that you can use when you set up a *Variable* in a *Calibration System* (Chapter 5, Figure 5-6).

Table A-2: *Parameters and units for Variables*

Parameter	Available units		
Area	cm2	in2	mi2
	ft2	km2	mm2
	ha	m2	yd2
Current/Current AC	A	Amps	
	mA	mAmps	
Density	g/cm^3	g/m^3	oz/gal
	kg/cm^3	kg/m^3	
	lb/ft^3	lb/in^3	
Frequency	GHz	Hz	
	kHz	MHz	
Mass	g	kg	mg
	oz	ton	ug
Pressure	atm	in H2O @ 4°C	mm H2O @ 4°C
	bar	in H2O @ 60°C	mmH2O
	cm H2O @ 4°C	inH2O	mmHg
	cm H2O	kg/cm2	MPa
	cm Hg @ 0°C	kg/m2	Pa
	cm Hg	kPa	psi
	ftH2O	lb/ft2	tonf/ft2
	hPa	mbar	tonf/in2
	in H2O @ 0°C	mH2O	Torr
	in H2O @ 20°C	mHg	
	in H2O @ 25°C		
Resistance	MOhm	Ohm	
Temperature	°C	°R	Celsius
	°F	°K	Fahrenheit
			Kelvin
Voltage	mV	V	Volts DC
	mVolts	Volts	
Voltage DC	mV	V	
	Volts	Volts DC	

Table A-2: *Parameters and units for Variables (Continued)*

Parameter	**Available units**		
Voltage AC	V Volts AC	Volts	

Customer service

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